



Environment &  
Conservation

**NASHVILLE ENVIRONMENTAL FIELD OFFICE**  
711 R. S. GASS BOULEVARD  
NASHVILLE, TENNESSEE 37216  
PHONE (615) 687-7000 STATEWIDE 1-888-891-8332 FAX (615) 687-7078

October 23, 2017

Gillian Walshe-Langford  
Air Monitoring Program  
Metro Public Health Department  
2500 Charlotte Avenue  
Nashville, Tennessee 37209

Subject: 3<sup>RD</sup> Quarter audits for 2017

Dear Ms. Walshe-Langford:

Attached are the audit results for the Third quarter of 2017.

All continuous monitors were audited Through the Probe and all sample lines and filters.

The following points were observed and addressed during the audits:

1. The CO monitor at Near Road failed on the low audit points of 199 ppb and 50 ppb. I know that historically the zero for that instrument shows a tendency to drift. I recommend the zero response be maintained as close to actual zero as possible. Volume 2 of the Quality Assurance Handbook indicates the Zero reading should be less than 30 parts per billion.
2. For the East and Near Road NO<sub>2</sub> monitors the monitor responses to the NO inputs is shown on the audit forms as a comparison because the NO response mirrors the NO<sub>2</sub> response.
3. On September 22, 2017, I attempted an audit of the ozone monitor at East. The calibrator I was using was unstable and indicating negative values. I terminated the audit to return to the office and investigate the problem. Once I set up the calibrator in the lab I noted that the vent port was closed off. This would not affect the other parameters being audited, but it does create excessive back pressure for the ozone photometer. Using the same calibrator three days later, untouched as far as redoing the calibration is concerned, both Percy Priest and East Health Center ozone monitors showed good correlation with the calibrator.
4. All other monitors and parameters were within acceptable guidelines.

Any questions concerning these audits may be directed to this office at (615) 687-7045 or to:  
[radford.l.strong@tn.gov](mailto:radford.l.strong@tn.gov).

Sincerely,



Environment &  
Conservation

Radford L. Strong  
Environmental Specialist  
TDEC Tech Services QA

Electronic copies to:  
Jason Stephens, APC  
Lance Allen, QA



Date: 09/26/17  
Site: 47-037-0023  
Lockeland  
Auditor: Radford Strong

Critical Criteria

Type: TEOM PM2.5  
Serial Number: 1405A231091503

Audit Equipment: Streamline Pro  
Serial Number: C 150306

Cert Date: 12-Jun-17

<u>Measured Parameter</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>Difference</u>	<u>Acceptable Range</u>	<u>Level*</u>
Sample Flow:	3.03	3.00	-0.99%	+/- 4.1% (5.1%)	
Bypass Flow:			#DIV/0!	+/- 4.1% (5.1%)	
Total Flow:	16.22	16.68	2.84%	+/- 4.1% (5.1%)	
Barometric Pressure:	748	743	-5	+/- 10.1 mm	
Ambient Temperature:	29.60	28.15	-1.45	+/- 2.1°C	
Clock Time:	9:50:00	9:45:00	#####	+/- 5:00 minutes	

Audit notes:

Date: 09/26/17  
Site: 47-037-0023  
Lockeland  
Auditor: Radford Strong

Critical Criteria

Type: TEOM PM10  
Serial Number: 1405A130201311

Audit Equipment: Streamline Pro  
Serial Number: C 150306

Cert Date: 12-Jun-17

<u>Measured Parameter</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>Difference</u>	<u>Acceptable Range</u>	<u>Level*</u>
Sample Flow:	3.05	3.00	-1.64%	+/- 4.1% (5.1%)	
Bypass Flow:			#DIV/0!	+/- 4.1% (5.1%)	
Total Flow:	16.43	16.67	1.46%	+/- 4.1% (5.1%)	
Barometric Pressure:	750	746	-4	+/- 10.1 mm	
Ambient Temperature:	29.20	27.70	-1.50	+/- 2.1°C	
Clock Time:	9:35:00	9:35:00	0:00:00	+/- 5:00 minutes	

Audit notes:

Date: 09/26/17  
Site: AQS Number  
47-037-0023  
Auditor: Radford Strong

Type: 2025 POC 1  
Serial Number: 20251020161204

Audit Equipment: Streamline Pro  
Serial Number:

Cert Date: 12-Jun-17

<u>Measured Parameter</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>Difference</u>	<u>Acceptable Range</u>	<u>Level*</u>
Sample Flow:			#DIV/0!	+/- 4.1% (5.1%)	

Barometric Pressure: 0 +/- 10.1 mm  
 Ambient Temperature: 0.00 +/- 2.1°C  
 Compartment Temperature: 0.00 +/- 2.1°C  
 Filter Temperature: 0.00 +/- 2.1°C  
 Leak Check 3.00 > 25 mm Hg  
 Clock Time: 0:00:00 +/- 00:01:00 minutes  
 Audit notes: Negative times are recorded as ####. POC 1 down for repair. POC 2 used as daily sampler.

**Date:** 09/26/17  
**Site:** 47-037-0023  
 Lockeland  
**Auditor:** Radford Strong

Type: 2025 POC 2 Audit Equipment: Streamline Pro Cert Date: 12-Jun-17  
 Serial Number: 2025IW207831504 Serial Number: C150306

<u>Measured Parameter</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>Difference</u>	<u>Acceptable Range</u>	<u>Level*</u>
Sample Flow:	16.53	16.68	0.91%	+/- 4.1% (5.1%)	
Barometric Pressure:	748	749	1	+/- 10.1 mm	
Ambient Temperature:	26.60	27.20	0.60	+/- 2.1°C	
Compartment Temperature:			0.00	+/- 2.1°C	
Filter Temperature:			0.00	+/- 2.1°C	
Leak Check			7.00	> 25 mm Hg	
Clock Time:	10:11:54	10:11:00	#####	+/- 00:01:00 minutes	
Audit notes:	Negative times are recorded as ####.				

**Date:** May 31, 2017  
**Site:** 47-037-0040  
 Near Road  
**Auditor:** Radford Strong

Type: 2025i PM2.5 Audit Equipment: Streamline Pro Cert Date: 12-Jun-17  
 Serial Number: 2025i107281205 Serial Number: C 150306

<u>Measured Parameter</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>Difference</u>	<u>Acceptable Range</u>	<u>Level*</u>
Sample Flow:	16.74	16.68	-0.36%	+/- 4.1% (5.1%)	
Barometric Pressure:	747	749	2	+/- 10.1 mm	
Ambient Temperature:	30.00	30.10	0.10	+/- 2.1°C	
Compartment Temperature:			0.00	+/- 2.1°C	
Filter Temperature:			0.00	+/- 2.1°C	
Leak Check			2.00	> 25 mm Hg	
Clock Time:	10:40:00	10:40:00	0:00:00	+/- 00:01:00 minutes	
Audit notes:					

**Date:** 09/26/17  
**Site:** 47-037-0023  
 Lockeland  
**Auditor:** Radford Strong

Type: BAM 1022 Audit Equipment: Streamline Pro Cert Date: 12-Jun-17

Serial Number: T23706

Serial Number: C 150306

<u>Measured Parameter</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>Difference</u>	<u>Acceptable Range</u>	<u>Level*</u>
Sample Flow:	16.67	16.70	0.18%	+/- 4.1% (5.1%)	
Barometric Pressure:	748	748	0	+/- 10.1 mm	
Ambient Temperature:	28.90	28.20	-0.70	+/- 2.1°C	
Compartment Temperature:			0.00	+/- 2.1°C	
Filter Temperature:			0.00	+/- 2.1°C	
Leak Check			Value	> 25 mm Hg	
Clock Time:	9:26:00	9:24:00	#####	+/- 00:01:00 minutes	
Audit notes:					

**Date:** 09/22/17  
**Site:** 47-037-0011  
Metro East Ozone  
**Auditor:** Radford Strong

Type: Thermo 49i  
Serial Number: CM09130037  
EnviroNics 6103 6371 08/31/17

<u>Ozone Set/Dilution Air</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>% Difference</u>	<u>Acceptable Range</u>	<u>Level *</u>
0/10000			0	< 3 ppb	Zero
40/10000			#DIV/0!	< 10.1 %	4
80/10000			#DIV/0!	< 10.1 %	6
120/10000			#DIV/0!	< 10.1 %	7
400/10000			#DIV/0!	< 10.1 %	10+

Audit notes: Calibrator unsteady; audit rescheduled.

**Date:** 09/26/17  
**Site:** 47-037-0040  
Near Road NO  
**Auditor:** Radford Strong

Type: Thermo 42i TL  
Serial Number: 1324658812  
Audit Equipment: EnviroNics 6103 6371 08/31/17  
Scott-Marrin FF39468 NO 19.87 06-Sep-20

<u>Measured Parameter sccm</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>% Difference</u>	<u>Acceptable Range</u>	<u>Level *</u>
0/10000	0	0	#DIV/0!	< 3 ppb	Zero
5/20L	5	5	0.00%	< 15.1 %	
10/10L	20	19	-5.00%	< 15.1 %	
30/10L	59	60	1.69%	< 15.1 %	
60/10L	119	119	0.00%	< 15.1 %	
200/10L	390	395	1.28%	< 15.1 %	

Audit notes: Included for comparison purposes.

**Date:** 09/26/17  
**Site:** 47-037-0040  
Near Road NO2  
**Auditor:** Radford Strong

Type:	Thermo 42i TL	Audit Equipment: Environics 6103	6371	08/31/17	
Serial Number	1324658812	Scott-Marrin FB 04179 NO	19.77	08-Oct-18	
<u>Measured Parameter sccm</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>% Difference</u>	<u>Acceptable Range</u>	<u>Level *</u>
0/10000	0	0.2	#DIV/0!	< 3 ppb	Zero
200/10000	37	36	-2.70%	< 15.1 %	5
60/10000	77	75	-2.60%	< 15.1 %	6
30/10000	119	112	-5.88%	< 15.1 %	7
Audit notes:					

**Date:** 09/25/17  
**Site:** 47-037-0026  
 Percy Priest Dam Ozone  
**Auditor:** Radford Strong

Type:	Thermo 49i	Environics 6103	6371	08/31/17	
Serial Number	1322458652				
<u>Ozone Set/Dilution Air</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>% Difference</u>	<u>Acceptable Range</u>	<u>Level *</u>
0/10000	0	0	0.00%	< 3 ppb	Zero
40/10000	40	41	-2.50%	< 10.1 %	4
80/10000	82	83	-1.22%	< 10.1 %	5
120/10000	115	120	-4.35%	< 10.1 %	6
	384	399	-3.91%	< 10.1 %	10+
Audit notes:	Shelter temp: measured with SLP C 150306 25.8 C/ 26.0C				

**Date:** 09/22/17  
**Site:** 47-037-0011  
 East Health Center SO2  
**Auditor:** Radford Strong

Type:	Thermo 49i	Audit Equipment: Environics 6103		6371	08/31/17
Serial Number	1153030011	Scott-Marrin FF 39468 SO2		20.43ppm	06-Sep-20
<u>Measured Parameter sccm</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>% Difference</u>	<u>Acceptable Range</u>	<u>Level *</u>
0/10000	0	0	#DIV/0!	< 3 ppb	Zero
200cc/10L	401	382	-4.74%	< 15.1 %	9
60cc/10L	122	117	-4.10%	< 15.1 %	7
30cc/10L	61	59	-3.28%	< 15.1 %	6
5cc/10L	10.2	8.8	-13.73%	< 15.1 %	4
Audit notes:	Site temperature checked by SLP C 150306: 24.8 C/23.8C				

**Date:** May 31, 2017  
**Site:** 47-037-0011  
 Metro East NO  
**Auditor:** Radford Strong

Type:	Thermo 42i TL		Audit Equipment: Environics 6103		6371	08/31/17
Serial Number	1153030011		Scott-Marrin FB 04179 NO		19.77	08-Oct-18
<u>Measured Parameter sccm</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>% Difference</u>	<u>Acceptable Range</u>	<u>Level *</u>	
0/10000	0	-1	#DIV/0!	< 3 ppb	Zero	
200/10000	390	359	-7.95%	< 15.1 %		

60/10000	119	110	-7.56%	< 15.1 %
30/10000	59	55	-6.78%	< 15.1 %
10/10000	9.9	8.1	-18.18%	< 15.1 %

Audit notes: Included for comparison purposes.

**Date:** 09/22/17  
**Site:** 47-037-0011  
 East Health Center NO2  
**Auditor:** Radford Srong

Type:	Thermo 42i TL	Audit Equipment: Environics 6103	6371	08/31/17	
Serial Number	1153030011	Scott-Marrin FF 39468 NO	19.87	08-Oct-18	
<u>Measured Parameter sccm</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>% Difference</u>	<u>Acceptable Range</u>	<u>Level *</u>
0/10000	0	0	#DIV/0!	< 3 ppb	Zero
200/10000	124	115	-7.26%	< 15.1 %	7
60/10000	80	73	-8.75%	< 15.1 %	6
30/10000	38	35	-7.89%	< 15.1 %	5

Audit notes:

**Date:** 09/26/17  
**Site:** 47-037-0040  
 Near Road CO  
**Auditor:** Radford Srong

Type:	Thermo 48i TLE	Audit Equipment: Environics 6103	6371	08/31/17	
Serial Number	1324658815	Scott-Marrin FF 39468 CO	198.7	06-Sep-20	
<u>Measured Parameter sccm</u>	<u>Audit Value</u>	<u>% Difference</u>	<u>Acceptable Range</u>	<u>Level *</u>	
0/10000	0	0.07	#DIV/0!	< ppb	Zero
5cc /20L	0.05	0.165	230%		
10cc/10L	0.199	0.27	35.68%	< 15.1 %	3
30cc/10L	0.594	0.685	15.32%	< 15.1 %	3
60cc/10L	1.185	1.29	8.86%	< 15.1 %	4
200cc/10L	3.9	4.04	3.59%	< 15.1 %	5
0/10000	0	0.08	#DIV/0!		

Audit notes:

Type:	Thermo 48i TLE		Audit Equipment: Environics 6103		6371	08/31/17
Serial Number	1324658815		Scott-Marrin FB 04179 CO		200.6	08-Oct-18
<u>Measured Parameter sccm</u>	<u>Audit Value</u>		<u>% Difference</u>	<u>Acceptable Range</u>	<u>Level *</u>	
0/10000	0	0.07	#DIV/0!	< ppb	Zero	
5cc /20L	0.05	0.085	70%		1	
10cc/10L	0.199	0.19	-4.52%	< 15.1 %	2	
30cc/10L	0.594	0.605	1.85%	< 15.1 %	3	
60cc/10L	1.185	1.21	2.11%	< 15.1 %	4	
200cc/10L	3.9	3.96	1.54%	< 15.1 %	5	
0/10000	0	0.08	#DIV/0!			

Audit notes: Subtraction of final zero yields more consistent results

**Date:** 09/25/17  
**Site:** 47-037-0011  
**Metro East Ozone**  
**Auditor:** Radford Strong

Type:	Thermo 49i	Envionics 6103			6371	08/31/17
Serial Number	CM09130037					
<u>Ozone Set/Dilution Air</u>	<u>Audit Value</u>	<u>Monitor Response</u>	<u>% Difference</u>	<u>Acceptable Range</u>	<u>Level *</u>	
0/10000	0	3	-3	< 3 ppb	Zero	
40/10000	50	52	4.00%	< 10.1 %	4	
80/10000	92	95	3.26%	< 10.1 %	6	
120/10000	133	137	3.01%	< 10.1 %	7	
400/10000	424	436	2.83%	< 10.1 %	10+	
Audit notes:						